INDEX

see Type I decision error		area of elevated activity	2-3, 4, 27, 28,
^			30; 5-35 to 39;
β			6-42 to 45; 8-22, 23, 27
see Type II decision error 91b material	2.5	demonstrating compliance	2-27
	3-5	determining data points	5-35
\mathbf{A}_{\min}	D 02	flagging	5-44
area of elevated activity	D-23	investigation level	5-44 to 46
action level	2-14, 27; 4-34,	final status survey design	2-29, 32;
	35; 7-3; D-6, 8, 9, 15, 16		5-46 to 52
octivity		area factor	2-27; 5-36 to 39;
activity	2-3; 3-11		8-16, 22, 24
activity concentration distribution	4-1, 6 2-29, 30;	arithmetic mean	
distribution	6-33, 34	see mean	
ratios	4-4, 5	arithmetic standard deviat	tion
gross activity	4-8	see standard deviation	
units of activity	2-14; 4-1	background (radiation)	
see elevated activity	,	activity	5-10, 11
air	3-19; 5-10, 14,	decommissioning	4-13
	18; 6-11, 13,	detection sensitivity	6-37, 39 to 49
	55 to 60; 7-13,	ground water	5-13
	16, 27; App. M	indistinguishable from	2-39
ALARA	2-5; 5-52; 8-21,	samples statistical tests	5-10, 11; 7-2, 5
	27; C-8 to 10	see background reference are	2-26; 4-9; 5-28
alpha (α) radiation	4-6, 7; 7-15	background reference area	
analysis	7-22	background reference area	16; 7-5; 8-3 to
detection sensitivity			11, 17 to 21; A-5
direct measurement	6-32 to 37		
unect measurement		background radiation	4-13
scanning	2-14; 5-48;	background radiation data points	4-13 5-25 to 31
scanning	2-14; 5-48; 6-47 to 49	data points	4-13 5-25 to 31 5-27
scanning detectors	2-14; 5-48; 6-47 to 49 6-15 to 17, 20		5-25 to 31
scanning detectors attenuation	2-14; 5-48; 6-47 to 49 6-15 to 17, 20 4-23, 25	data points P _r	5-25 to 31
scanning detectors	2-14; 5-48; 6-47 to 49 6-15 to 17, 20 4-23, 25 5-12, 13;	data points P_r relative shift	5-25 to 31 5-27
scanning detectors attenuation measurement	2-14; 5-48; 6-47 to 49 6-15 to 17, 20 4-23, 25 5-12, 13; 6-13, 14	data points P _r relative shift WRS test	5-25 to 31 5-27 5-26
scanning detectors attenuation measurement radon	2-14; 5-48; 6-47 to 49 6-15 to 17, 20 4-23, 25 5-12, 13; 6-13, 14 6-55 to 59	data points P _r relative shift WRS test survey	5-25 to 31 5-27 5-26
scanning detectors attenuation measurement	2-14; 5-48; 6-47 to 49 6-15 to 17, 20 4-23, 25 5-12, 13; 6-13, 14 6-55 to 59 2-39; 5-25;	data points P _r relative shift WRS test survey Becquerel (Bq)	5-25 to 31 5-27 5-26
scanning detectors attenuation measurement radon alternative hypothesis	2-14; 5-48; 6-47 to 49 6-15 to 17, 20 4-23, 25 5-12, 13; 6-13, 14 6-55 to 59	data points P _r relative shift WRS test survey Becquerel (Bq) see conversion table beta (β) radiation analysis	5-25 to 31 5-27 5-26 5-1, 2, 10
scanning detectors attenuation measurement radon alternative hypothesis area	2-14; 5-48; 6-47 to 49 6-15 to 17, 20 4-23, 25 5-12, 13; 6-13, 14 6-55 to 59 2-39; 5-25; 8-11, 17	data points P _r relative shift WRS test survey Becquerel (Bq) see conversion table beta (β) radiation analysis detection sensitivity	5-25 to 31 5-27 5-26 5-1, 2, 10 4-6 7-21, 22
scanning detectors attenuation measurement radon alternative hypothesis area evaluation & HSA	2-14; 5-48; 6-47 to 49 6-15 to 17, 20 4-23, 25 5-12, 13; 6-13, 14 6-55 to 59 2-39; 5-25; 8-11, 17	data points P _r relative shift WRS test survey Becquerel (Bq) see conversion table beta (β) radiation analysis detection sensitivity direct measurement	5-25 to 31 5-27 5-26 5-1, 2, 10 4-6 7-21, 22 6-32 to 37
scanning detectors attenuation measurement radon alternative hypothesis area	2-14; 5-48; 6-47 to 49 6-15 to 17, 20 4-23, 25 5-12, 13; 6-13, 14 6-55 to 59 2-39; 5-25; 8-11, 17 3-11 2-4, 5, 17, 28;	data points P _r relative shift WRS test survey Becquerel (Bq) see conversion table beta (β) radiation analysis detection sensitivity	5-25 to 31 5-27 5-26 5-1, 2, 10 4-6 7-21, 22 6-32 to 37 2-14; 5-48;
scanning detectors attenuation measurement radon alternative hypothesis area evaluation & HSA classification	2-14; 5-48; 6-47 to 49 6-15 to 17, 20 4-23, 25 5-12, 13; 6-13, 14 6-55 to 59 2-39; 5-25; 8-11, 17 3-11 2-4, 5, 17, 28; 4-11	data points P _r relative shift WRS test survey Becquerel (Bq) see conversion table beta (β) radiation analysis detection sensitivity direct measurement scanning	5-25 to 31 5-27 5-26 5-1, 2, 10 4-6 7-21, 22 6-32 to 37 2-14; 5-48; 6-37 to 47
scanning detectors attenuation measurement radon alternative hypothesis area evaluation & HSA classification contaminated	2-14; 5-48; 6-47 to 49 6-15 to 17, 20 4-23, 25 5-12, 13; 6-13, 14 6-55 to 59 2-39; 5-25; 8-11, 17 3-11 2-4, 5, 17, 28; 4-11 2-3	data points P _r relative shift WRS test survey Becquerel (Bq) see conversion table beta (β) radiation analysis detection sensitivity direct measurement scanning detectors	5-25 to 31 5-27 5-26 5-1, 2, 10 4-6 7-21, 22 6-32 to 37 2-14; 5-48; 6-37 to 47 6-15 to 17, 21
scanning detectors attenuation measurement radon alternative hypothesis area evaluation & HSA classification	2-14; 5-48; 6-47 to 49 6-15 to 17, 20 4-23, 25 5-12, 13; 6-13, 14 6-55 to 59 2-39; 5-25; 8-11, 17 3-11 2-4, 5, 17, 28; 4-11	data points P _r relative shift WRS test survey Becquerel (Bq) see conversion table beta (β) radiation analysis detection sensitivity direct measurement scanning detectors attenuation	5-25 to 31 5-27 5-26 5-1, 2, 10 4-6 7-21, 22 6-32 to 37 2-14; 5-48; 6-37 to 47 6-15 to 17, 21 4-23, 25
detectors attenuation measurement radon alternative hypothesis area evaluation & HSA classification contaminated land	2-14; 5-48; 6-47 to 49 6-15 to 17, 20 4-23, 25 5-12, 13; 6-13, 14 6-55 to 59 2-39; 5-25; 8-11, 17 3-11 2-4, 5, 17, 28; 4-11 2-3 4-26	data points P _r relative shift WRS test survey Becquerel (Bq) see conversion table beta (β) radiation analysis detection sensitivity direct measurement scanning detectors attenuation measurement	5-25 to 31 5-27 5-26 5-1, 2, 10 4-6 7-21, 22 6-32 to 37 2-14; 5-48; 6-37 to 47 6-15 to 17, 21 4-23, 25 5-12, 13
scanning detectors attenuation measurement radon alternative hypothesis area evaluation & HSA classification contaminated land reference coordinate system	2-14; 5-48; 6-47 to 49 6-15 to 17, 20 4-23, 25 5-12, 13; 6-13, 14 6-55 to 59 2-39; 5-25; 8-11, 17 3-11 2-4, 5, 17, 28; 4-11 2-3 4-26 4-27	data points P _r relative shift WRS test survey Becquerel (Bq) see conversion table beta (β) radiation analysis detection sensitivity direct measurement scanning detectors attenuation measurement radon	5-25 to 31 5-27 5-26 5-1, 2, 10 4-6 7-21, 22 6-32 to 37 2-14; 5-48; 6-37 to 47 6-15 to 17, 21 4-23, 25 5-12, 13 6-55, 58, 59
detectors attenuation measurement radon alternative hypothesis area evaluation & HSA classification contaminated land reference coordinate system scanning	2-14; 5-48; 6-47 to 49 6-15 to 17, 20 4-23, 25 5-12, 13; 6-13, 14 6-55 to 59 2-39; 5-25; 8-11, 17 3-11 2-4, 5, 17, 28; 4-11 2-3 4-26 4-27 2-31; 5-46 to 48 4-17 3-21	data points P _r relative shift WRS test survey Becquerel (Bq) see conversion table beta (β) radiation analysis detection sensitivity direct measurement scanning detectors attenuation measurement radon bias	5-25 to 31 5-27 5-26 5-1, 2, 10 4-6 7-21, 22 6-32 to 37 2-14; 5-48; 6-37 to 47 6-15 to 17, 21 4-23, 25 5-12, 13 6-55, 58, 59 2-11; 4-32 to 38
detectors attenuation measurement radon alternative hypothesis area evaluation & HSA classification contaminated land reference coordinate system scanning site	2-14; 5-48; 6-47 to 49 6-15 to 17, 20 4-23, 25 5-12, 13; 6-13, 14 6-55 to 59 2-39; 5-25; 8-11, 17 3-11 2-4, 5, 17, 28; 4-11 2-3 4-26 4-27 2-31; 5-46 to 48 4-17	data points P _r relative shift WRS test survey Becquerel (Bq) see conversion table beta (β) radiation analysis detection sensitivity direct measurement scanning detectors attenuation measurement radon	5-25 to 31 5-27 5-26 5-1, 2, 10 4-6 7-21, 22 6-32 to 37 2-14; 5-48; 6-37 to 47 6-15 to 17, 21 4-23, 25 5-12, 13 6-55, 58, 59

biased sample measurement	nt	comparability	2-11; 6-6; 7-6, 12; N-12 to 15
byproduct material	C-15, 16	completeness	2-11; 6-6, 7; 7-6,
byproducts	3-5	completeness	7; N-14 to 16
calibration	4-17; 6-20 to 28;	computer code	7,11 14 to 10
Canbi ation	7-4, 13; 9-5, 6	DEFT	D-20, 21
CEDE (committed effective		ELIPGRID	D-23
`		RESRAD	5-36
equivalent)	2-2	RESRAD-BUILD	5-36
CERCLA	2-22, 39; 3-1, 2;	conceptual site model	3-21, 22; 4-21;
	5-1, 7	conceptual site model	5-8, 47; 7-11, 13,
compared to MARSSIM	App. F		15; A-10
Chain of Custody	5-3, 17;	confidence interval	6-53 to 55
	7-23 to 25; 9-8	alternate null hypothesis	2-36
characterization survey	2-15, 16, 22, 23;		2-30
	3-24; 4-21;	confirmatory survey survey design	5-21
	5-7 to 17; A-17	see final status survey	3-21
checklist	5-16, 17	contamination	1 1 2 2 6
DCGLs	4-4		1-1, 2, 3, 6
checklist(s)		characterization survey	5-7 to 15
see survey checklist		classification	2-4, 5, 28; 3-3; 4-11
Class 1 area	2-5; 4-11; 5-48;	DCGLs	2-2, 3; 4-3
	8-24, 25	decommissioning criteria	5-25
investigation level	5-45	field measurements	6-5, 6
scanning	2-32; 5-46	final status survey	5-25 to 52
Class 2 area	2-5; 4-12; 5-49;	HSA	2-22
	8-24	historical data	3-7, 10
investigation level	5-45	reconnaissance	3-9
scanning	2-32; 5-47	identifying	3-11
Class 3 area	2-5; 4-12; 5-49	in soil	3-13, 14
investigation level	5-45	in water	3-15, 17
scanning	2-33; 5-48	in structures	3-20
classification	2-4, 10, 17, 28;	in air	3-19
	3-1, 12, 22; 4-11;	remedial action	2-23; 5-18, 19
	5-46 to 51; 7-7;	sampling	7-11 to 16;
	8-1, 2, 15, 16, 22,		App. M
	24, 27; A-5; N-16	surrogate measurements	4-4
areas	2-5	see area of elevated activity	
HSA/scoping	2-23	see impacted area	4 00 05
see Class 1, 2, and 3 area		control chart	4-33, 37;
cleanup	1-1, 4; 5-18, 19		6-5, 7, 8
regulations	1-3	corrective action	2-23; 6-28; 7-11;
release criterion	2-2	1.	9-8, 9
cleanup standard	2-2	bias	N-10
cleanup (survey) unit		comparability	N-15
see survey unit		completeness precision	N-16
coefficient of variation	5-26	•	N-9 N-13
		representativeness	11-13

criterion		Data Quality Objectives (I	OOS)
alternate hypothesis	2-39		1-3, 4; 2-7, 9;
compliance	2-25		4-4, 19; 5-2, 8,
DCGLs	4-3		21, 52; 6-2;
FSS	2-24		7-1, 2; 8-1, 2;
measurement	6-1		9-2, 7, 8; App.D
QC	4-32 to 38	DQO Process	2-10; App. D
release criterion	1-1 to 3; 3-24	iterations (figure)	D-3
statistical tests	2-22, 34	state problem	D-4
null hypothesis	2-9	identify decision	D-5
critical level (L _c)	6-32 to 37	inputs	D-5, 6
critical value	8-12, 13, 15, 18,	study boundaries	D-6 to 8
critical value	21; A-18;	develop decision rule	D-8 to 13
	D-16, 17	decision errors	D-13 to 28
ourie (Ci)	D-10, 17	optimize design	D-28, 29
curie (Ci)		HSA	3-2
see conversion table		Planning	2-9
data		preliminary review (DQA)	E-1
conversion	6-28 to 31	measurement uncertainty	6-50
data interpretation checklist	8-27	QAPP	9-2, 3
distribution	8-4, 5	data quality indicators	2-11; 6-3, 7; 7-2,
number of points needed	2-10	dutti quarty mateutors	7; 9-9; N-6 to 18
EMC	5-35 to 39	Derived Concentration Gu	
Sign test	5-31 to 35		
WRS test	5-25 to 31	(DCGL)	2-2, 11, 33;
preliminary review (DQA)	E-3		4-3 to 11; 6-1, 2,
review	N-5		7, 19, 32, 50;
skewness	8-5		7-2, 7, 9; 8-2, 6,
spatial dependency	8-4		11, 22, 26; 9-5
see mean, median, standard d	leviation	$\mathrm{DCGL}_{\mathrm{W}}$	2-3; A-2; D-9
see posting plot		$\mathrm{DCGL}_{\mathrm{EMC}}$	2-3
see ranked data		HSA	3-1, 12
see stem and leaf display		gross activity	4-8
Data Life Cycle	2-6 to 12; 4-35;	sampling	7-2, 7, 9
Butu Elle Offic	5-46; 9-2, 3, 5	surveys	5-1
figure	2-7	decay	
steps:	2-1	see radioactive decay	
1. planning	2-8; App. D	decision error	D-13 to 17,
2. implementation	2-11		20 to 22, 26 to
3. assessment	2-11; App. E		29; N-17
4. decision making	2-7	error chart	D-27
table	2-16	false positive	D-14, 21, 26
and the same of th	2 10	see Type I error	2 11, 21, 20
Data Quality Assessment (DQA)	false negative	D-15, 20
	1-4; 2-6; 5-46;	see Type II error	
	8-1, 2; 9-2, 5;	feasibility trials	
	App. E	DEFT	D-20, 21
assessment phase	2-8, 11; App. E	specifying limits	D-15
historical data	3-7	table	D-15

decision maker	2-6; 4-14; 5-46;	direct measurement	2-4; 4-17;
1, , , , , , , , , , , , , , , , , , ,	6-27; 7-2, 18; 9-8	1 1 1	Chap. 6
alternate methods	2-32	background	6-7, 35
estimating uncertainty	2-11	description	6-10 to 13
DQOs	3-2; 6-2	detectors	6-15 to 22;
decision rule	1-2; 8-24	:	App. H
one-sample case	D-11	instruments	4-16, 6-15 to 28 4-17
power chart (example)	D-25	methods QC	4-17 4-32 to 38
two-sample case	D-12	radon	4-32 to 38 6-55 to 60
decision statement	8-24; D-2, 5, 6	replicates	6-33 to 60
decommissioning	1-1; 2-3; 3-1	sensitivity	6-31 to 49
Characterization Survey	2-23; 5-7, 8	surveys	5-45 to 51
criteria	4-1	distribution coefficient (K _d	
documentation	5-52		
simplified procedure	App. B	documentation	N-2 to 4
site identification	2-16	dose equivalent (dose)	1-1, 3; 2-1, 2
site investigation	4-1	DCGL	2-3; 5-36 to 38
delta (δ)	5-26 to 35;	release criterion	2-2
	8-12 to 15, 19,	effective probe area	6-29, 37
	23; A-11, 19;	elevated area	
	D-10, 13, 16, 17,	see area of elevated activity	
	20, 21	elevated measurement	
delta (Δ)	2-9, 10, 31	see area of elevated activity	
see relative shift		Elevated Measurement Co	mnarison
detection limit		(EMC)	2-3, 27, 32;
see minimum detectable cond	centration	(EMC)	2-3, 27, 32; 8-5, 9, 17, 18,
detector(s)	Chap. 6; 9-6;		21 to 23
(1)	App. H	$\mathrm{DCGL}_{\mathrm{EMC}}$	2-3, 27
alpha	11	number of data points	5-35 to 39
	C 15 to 10 20	number of data points	3 33 10 37
field survey	6-15 to 18, 20;	example	5-39· A-16
field survey	6-15 to 18, 20; H-5 to 10	example see area of elevated activity	5-39; A-16
laboratory		see area of elevated activity	
·	H-5 to 10	-	2-2, 15, 27;
·	H-5 to 10 7-20, 22;	see area of elevated activity exposure pathway model	2-2, 15, 27; 5-38, 44; 8-9, 23
laboratory	H-5 to 10 7-20, 22;	see area of elevated activity	2-2, 15, 27; 5-38, 44; 8-9, 23 4-20; 5-9 to 11,
laboratory	H-5 to 10 7-20, 22; H-38 to 42	see area of elevated activity exposure pathway model exposure rate	2-2, 15, 27; 5-38, 44; 8-9, 23 4-20; 5-9 to 11, 17, 51
laboratory	H-5 to 10 7-20, 22; H-38 to 42 6-15 to 18, 21; H-11 to 14 7-20, 21;	see area of elevated activity exposure pathway model exposure rate field sampling plan	2-2, 15, 27; 5-38, 44; 8-9, 23 4-20; 5-9 to 11, 17, 51 2-6; 9-3
laboratory beta field survey laboratory	H-5 to 10 7-20, 22; H-38 to 42 6-15 to 18, 21; H-11 to 14 7-20, 21; H-43 to 45	see area of elevated activity exposure pathway model exposure rate field sampling plan field survey equipment	2-2, 15, 27; 5-38, 44; 8-9, 23 4-20; 5-9 to 11, 17, 51
laboratory beta field survey laboratory calibration	H-5 to 10 7-20, 22; H-38 to 42 6-15 to 18, 21; H-11 to 14 7-20, 21; H-43 to 45 6-20 to 28	exposure pathway model exposure rate field sampling plan	2-2, 15, 27; 5-38, 44; 8-9, 23 4-20; 5-9 to 11, 17, 51 2-6; 9-3
laboratory beta field survey laboratory calibration in situ spectrometry	H-5 to 10 7-20, 22; H-38 to 42 6-15 to 18, 21; H-11 to 14 7-20, 21; H-43 to 45	see area of elevated activity exposure pathway model exposure rate field sampling plan field survey equipment	2-2, 15, 27; 5-38, 44; 8-9, 23 4-20; 5-9 to 11, 17, 51 2-6; 9-3 H-5 to 37 2-4, 24, 32; 3-24; 5-21 to 55; 8-1,
laboratory beta field survey laboratory calibration in situ spectrometry gamma	H-5 to 10 7-20, 22; H-38 to 42 6-15 to 18, 21; H-11 to 14 7-20, 21; H-43 to 45 6-20 to 28 6-11, 12	see area of elevated activity exposure pathway model exposure rate field sampling plan field survey equipment	2-2, 15, 27; 5-38, 44; 8-9, 23 4-20; 5-9 to 11, 17, 51 2-6; 9-3 H-5 to 37 2-4, 24, 32; 3-24; 5-21 to 55; 8-1, 6, 10, 23 to 25;
laboratory beta field survey laboratory calibration in situ spectrometry	H-5 to 10 7-20, 22; H-38 to 42 6-15 to 18, 21; H-11 to 14 7-20, 21; H-43 to 45 6-20 to 28 6-11, 12 6-15 to 18, 22;	exposure pathway model exposure rate field sampling plan field survey equipment final status survey	2-2, 15, 27; 5-38, 44; 8-9, 23 4-20; 5-9 to 11, 17, 51 2-6; 9-3 H-5 to 37 2-4, 24, 32; 3-24; 5-21 to 55; 8-1, 6, 10, 23 to 25; 9-5
laboratory beta field survey laboratory calibration in situ spectrometry gamma field survey	H-5 to 10 7-20, 22; H-38 to 42 6-15 to 18, 21; H-11 to 14 7-20, 21; H-43 to 45 6-20 to 28 6-11, 12 6-15 to 18, 22; H-15 to 24	see area of elevated activity exposure pathway model exposure rate field sampling plan field survey equipment final status survey checklist	2-2, 15, 27; 5-38, 44; 8-9, 23 4-20; 5-9 to 11, 17, 51 2-6; 9-3 H-5 to 37 2-4, 24, 32; 3-24; 5-21 to 55; 8-1, 6, 10, 23 to 25; 9-5 5-53 to 55
laboratory beta field survey laboratory calibration in situ spectrometry gamma	H-5 to 10 7-20, 22; H-38 to 42 6-15 to 18, 21; H-11 to 14 7-20, 21; H-43 to 45 6-20 to 28 6-11, 12 6-15 to 18, 22; H-15 to 24 7-20, 21;	see area of elevated activity exposure pathway model exposure rate field sampling plan field survey equipment final status survey checklist classification	2-2, 15, 27; 5-38, 44; 8-9, 23 4-20; 5-9 to 11, 17, 51 2-6; 9-3 H-5 to 37 2-4, 24, 32; 3-24; 5-21 to 55; 8-1, 6, 10, 23 to 25; 9-5 5-53 to 55 2-28; 4-11
laboratory beta field survey laboratory calibration in situ spectrometry gamma field survey laboratory	H-5 to 10 7-20, 22; H-38 to 42 6-15 to 18, 21; H-11 to 14 7-20, 21; H-43 to 45 6-20 to 28 6-11, 12 6-15 to 18, 22; H-15 to 24 7-20, 21; H-46 to 48	see area of elevated activity exposure pathway model exposure rate field sampling plan field survey equipment final status survey checklist classification compliance	2-2, 15, 27; 5-38, 44; 8-9, 23 4-20; 5-9 to 11, 17, 51 2-6; 9-3 H-5 to 37 2-4, 24, 32; 3-24; 5-21 to 55; 8-1, 6, 10, 23 to 25; 9-5 5-53 to 55 2-28; 4-11 2-25
laboratory beta field survey laboratory calibration in situ spectrometry gamma field survey laboratory low energy	H-5 to 10 7-20, 22; H-38 to 42 6-15 to 18, 21; H-11 to 14 7-20, 21; H-43 to 45 6-20 to 28 6-11, 12 6-15 to 18, 22; H-15 to 24 7-20, 21; H-46 to 48 H-31 to 33	see area of elevated activity exposure pathway model exposure rate field sampling plan field survey equipment final status survey checklist classification compliance DCGL	2-2, 15, 27; 5-38, 44; 8-9, 23 4-20; 5-9 to 11, 17, 51 2-6; 9-3 H-5 to 37 2-4, 24, 32; 3-24; 5-21 to 55; 8-1, 6, 10, 23 to 25; 9-5 5-53 to 55 2-28; 4-11 2-25 4-3
laboratory beta field survey laboratory calibration in situ spectrometry gamma field survey laboratory low energy radon	H-5 to 10 7-20, 22; H-38 to 42 6-15 to 18, 21; H-11 to 14 7-20, 21; H-43 to 45 6-20 to 28 6-11, 12 6-15 to 18, 22; H-15 to 24 7-20, 21; H-46 to 48 H-31 to 33 6-57; H-25 to 30	see area of elevated activity exposure pathway model exposure rate field sampling plan field survey equipment final status survey checklist classification compliance DCGL example	2-2, 15, 27; 5-38, 44; 8-9, 23 4-20; 5-9 to 11, 17, 51 2-6; 9-3 H-5 to 37 2-4, 24, 32; 3-24; 5-21 to 55; 8-1, 6, 10, 23 to 25; 9-5 5-53 to 55 2-28; 4-11 2-25 4-3 App. A
laboratory beta field survey laboratory calibration in situ spectrometry gamma field survey laboratory low energy	H-5 to 10 7-20, 22; H-38 to 42 6-15 to 18, 21; H-11 to 14 7-20, 21; H-43 to 45 6-20 to 28 6-11, 12 6-15 to 18, 22; H-15 to 24 7-20, 21; H-46 to 48 H-31 to 33	see area of elevated activity exposure pathway model exposure rate field sampling plan field survey equipment final status survey checklist classification compliance DCGL	2-2, 15, 27; 5-38, 44; 8-9, 23 4-20; 5-9 to 11, 17, 51 2-6; 9-3 H-5 to 37 2-4, 24, 32; 3-24; 5-21 to 55; 8-1, 6, 10, 23 to 25; 9-5 5-53 to 55 2-28; 4-11 2-25 4-3

final status survey (continu	ed)	grid (continued)	
health and safety	4-38	sample/scan	2-32; 5-40
integrated design	2-32	spacing	5-42
investigation process	2-16	triangular grid	5-40 to 43
planning	2-9; 5-21 to 55	figure	5-43
sampling	7-7 to 16;	half-life (t _{1/2})	1-5; 4-6; 6-55;
1 0	App. M		A-1; B-1
survey units	4-14	histogram	11 1, D 1
fluence rate	6-11, 12, 44	see frequency plot	
frequency plot	8-4, 5	see stem and leaf display	
gamma (γ) radiation		Historical Site Assessment	(HSA)
analysis	7-21		1-3, 4; 2-16, 22;
detection sensitivity	6-31		Chap. 3; 5-1, 16,
direct measurement	6-32 to 37		39; 6-14; 7-12;
scanning	6-37 to 47		8-9; A-1
detectors	6-15 to 18, 22;	data sources	App. G
	7-20, 21; H-15 to	figure	2-18
	24, 46 to 48	information sources	App. G
measurement	4-16	survey planning	4-11
radon	6-55, 57, 60	hot measurement	
scanning	6-14	see area of elevated activity	
spectrometry	4-16	hot spot	
surface measurement	6-11, 12	see area of elevated activity	
graded approach	1-5; 2-4, 5, 8;		2 26, 9 9 12 19
8 11	3-1; 6-8; 8-1;	hypothesis	2-26; 8-8, 12, 18
	9-2, 3, 5	alternative hypothesis	2-39; D-14, 15
graphical data review	8-4; E-3	null hypothesis	2-9, 26; 8-11, 15,
see frequency plot	0 4, L 3	-4-44	17, 23; D-14, 15
see posting plot		statistical testing	1-3; 2-13, 26
see stem and leaf display		approach explained	2-26
gray region	2.0. 21, 5.25 to	Sign test WRS test	2-28; 8-11
gray region	2-9, 31; 5-25 to		2-28; 8-17
	27, 32, 33; 6-7;	impacted area	2-4
	7-7, 8 to 12, 14,	classification	4-11
	19; D-16, 17, 20 to 22, 26, 28	DQO	3-2
avamula		HSA	2-23; Chap. 3
example	A-7, 11	non-impacted	2-4
see decision error		Scoping Survey	2-23
see lower bound (LBGR)	0.01 4.05 . 01	site diagram	3-23
grid	2-31; 4-27 to 31;	survey design	2-25
	5-3, 16, 40 to 43;	see residual radioactivity	
	7-7	indistinguishable from bac	
example	A-7, 13, 14, 15		2-39; D-19
positioning systems	6-61, 62	infiltration rate	3-14, 16, 18
random start example	5-40, 41; A-14	inventory	3-8; 4-26
reference coordinate system	2-23; 4-27;	· - · - •	-, ~
	6-61, 66		
example(s)	4-28, 29, 30		

investigation level	2-2, 32; 4-1;	minimum detectable conce	ntration
	5-18, 44 to 46; 6-14, 15;	(MDC)	2-10, 34; 4-16, 17, 34, 35;
arramala (tabla)	8-9, 17, 21		5-36, 37, 48;
example (table)	5-45 6-3		6-31 to 49;
scanning			8-15, 18, 22;
survey strategy see release criterion	5-46		9-7 to 9
see release criterion see action level		direct measurement	6-32 to 37
	2 22 22 20 22	elevated activity	5-39
judgment measurement	2-22, 23, 30, 33;	reporting	2-13
	5-2, 3, 44, 48,	scan	6-37 to 49
Irougt townsin	51, 55	minimum detectable count	
karst terrain	3-19	(MDCR)	6-40 to 45
laboratory equipment	4-16; H-38 to 48	missing or unusable data	5-29, 31, 33, 35
less-than data	2-13	model(s)	
license	2-16; 3-4, 5, 7, 8;	conceptual site model	3-3, 22; 5-8, 47
	7-11	defining study boundaries	D-6, 7
license termination		exposure pathway	1-4; 2-2, 15, 27;
see decommissioning		_	6-10, 28
lower bound of the gray re	gion (LBGR)	area factor (example)	5-36
•	2-9, 31; 5-25 to	determining DCGLs	4-3, 6
	27, 31 to 33; 6-7;	N (number of data points)	2-10; 5-25 to 39;
	7-7; 8-12, 13, 15,		8-12, 13, 15, 18
	19; D-17, 20,	QC measurements	4-32 to 38
	21, 28; N-18	Sign test	5-31 to 35
example	A-11	example	5-33, 35; B-2
see gray region		table WRS test	5-34 5-25 to 21
m (number of data points i	in the reference		5-25 to 31 5-29, 31;
area)	5-29, 39, 42;	example	3-29, 31, A-11; B-2
	8-18, 21	table	5-30
mean	2-27, 28; 4-33;	n (number of data points i	
	5-49, 50; 8-2, 3,	n (number of data points i	5-29, 38, 42;
	5 to 7, 12, 13, 15;		8-18, 21
	D-9	NARM	3-4
of data (example)	8-3	naturally occurring radion	
measurement techniques	1-2, 4; 2-4; 3-7;	naturany occurring radion	1-4; 3-3; 6-5; 7-5
	4-16, 17;	non-impacted area	2-4
1.	7-20 to 22	background (reference area)	4-13
median	2-28; 5-27, 32,	classification	2-28; 4-11
	45; 8-2, 3, 5 to 7,	DQO	3-2
	12, 13, 15; D-9	HSA	2-17;
			3-10 to 12
		survey design	2-31

nonparametric test	2-26; 4-10, 11; 5-25; 8-6, 7, 22,	quality assurance (QA)	2-6; 4-32; 8-1, 2, 4, 7; 9-1 to 4
altamata mathada	24, 25 2, 24 to 28	review of HSA	3-25
alternate methods one-sample test	2-34 to 38 2-28; 5-31;	document comparison tables	App. K
one-sample test	8-11 to 16; D-10	Quality Assurance Project	
two-sample test	2-28; 5-25; 8-17 to 21; D-10		2-6; 4-31, 32; 5-5, 54, 55; 7-9; 9-2, 3, 6
see Sign test see Wilcoxon Rank Sum test see Wilcoxon Signed Rank tes	st	quality control (QC) field measurement control laboratory control	2-6; 8-2; 9-1, 5, 7 6-3 to 8 7-2 to 7
normal (gaussian) distribu	tion	number of measurements	4-32 to 38
,	2-28; 5-45;	quality system	9-1 to 4
	6-54, 55; 8-6; I-1	2 0	
one-sample test	2-28; 5-25,	Quantile plot	8-4, 7, 8, 13;
•	31 to 35		I-18 to 21
see Sign test		Quantile-Quantile plot	A-16, 17;
outlier	9-7	D	I-22 to 24
$\mathbf{P}_{\mathbf{r}}$	5-27, 28; I-27, 28	R	5-29, 31, 33, 35
performance evaluation	4-35, 37; 6-4, 9;	$\mathbf{R_{A}}$	D-23
Portorium o variation	7-4, 10	radiation program manage	
physical probe area	6-29, 30, 38, 48	list by region	App. L
posting plot	2-27; 8-4, 8, 13	radiation survey	1-1, 4;4-4, 21
power (1-β)	2-31, 34; 4-26;	data life cycle	2-16
power (1-p)	5-27, 29, 33, 54;	HSA	2-22; 3-1, 8
	6-15, 17; 8-2, 3,	scoping survey	2-22; 5-1 to 6
	5, 6, 8, 12, 15,	characterization survey	2-23; 5-7 to 17
	23, 27; D-15,	remedial action support surve	2-23; 5-18 to 20
	17 to 19, 25, 26	final status survey	2-23; 5-18 to 20 2-24; 5-21 to 55
Sign test	I-25, 26	planning	2-24, 3-21 to 33 2-8 to 11;
WRS test	I-27 to 29	planning	Chap. 4; Chap. 5
chart	D-25	process	2-14, 17 to 21
power curve	I-26, 29	radioactive decay	3-12; 7-18, 20
example	A-7, 9, 11, 12	decay chain	4-6, 7
precision	2-11; 4-32 to 38;	half-life	4-5
	9-9; N-6 to 8	radon	6-55, 58, 59
global positioning system	6-61, 62	scan MDC	6-44 to 46
QC measurements	4-35, 37; 6-3, 4;	survey design	5-5, 8, 16
	7-3, 4	radioactivity	
probe area	6-20, 21, 24, 29,	see residual radioactivity	
	30, 36, 37, 38,	radiological survey	
	43, 48	see radiation survey	
quality	2-6, 8, 9	radionuclide	2-2, 5
assessment data	2-11	compliance/dose	2-25
data quality needs	2-8	see unity rule	
HSA data	3-10	·	
professional judgment	3-22		

ranked data 1-22 interpolated ranks 1-23 removable activity 5-17, 52; RCRA 2-22, 23, 39; 3-1; compared to MARSSIM App. F removal criteria 2-25; 2-2 perciteria reference coordinate system see grid App. F of structures/equipment 4-24 to 26 App. F DOD C-15 to 20 DOB C-15 to 20 C-15 to 20 DOB Pelicate 4-35, 37 FRA C-1 to 4 NRC C-12 to 15 States Templicate 4-35, 37 States C-20, 21 Telative shift (Δ/σ) 5-26 to 35, 40, 42, 81-2 to 15, 19, 19, 11, 20 representativeness 2-11, 24; 4-34; 6-66; 7-3; N-12, 13 realization surport A-11, 19 (app. 17, 20) Poly 17, 20 representativeness 2-11, 24; 4-34; 6-66; 7-3; N-12, 13 Poly 17, 20 (acleulate size example S-20, 5-33; App. 4-12, 14, 14, 14, 14, 14, 14, 14, 14, 14, 14	radon	3-20; 5-14; 6-55 to 60	remediation see remedial action support	1-1, 3, 4; 8-9, 11 <i>survey</i>
Fanked data 1-22	random uncertainty	2-14; 6-50 to 52	removable activity	5-17, 52;
Interpolated ranks I-23 See surface contamination Sec Surface Sec Superflow Superflow Superflow Superflow App. F		I-22	·	
RCRA 2-22, 23, 39; 3-1; 5-1, 7 removal criteria 2-23; App. F compared to MARSSIM App. F criteria 2-23; App. F reference coordinate system see grid App. F 4-24 to 26 see grid App. F App. F Pegulations & requirements App. C scoping survey 5-2 DOD C-15 to 20 replicate 4-35, 37 DOE C-4 to 12 sample 7-3 EPA C-1 to 4 measurement 6-3 NRC C-20, 21 representativeness 2-11, 24; 4-34; relative shift (Δ/σ) 5-26 to 35, 40, 42; 8-12 to 15, 19; D-17, 20 representativeness 2-11, 24; 4-34; relative shift (Δ/σ) 5-26, 5-32 residual radioactivity 2-3, 26; 3-24; example 5-29, 5-33; residual radioactivity 2-3, 26; 3-24; example 5-29, 5-33; land areas 5-11 P, 5-27 structures 5-10 Sign p 5-32 final status survey 141, 24 N/2 (WRS test) 5-34<			see surface contamination	
S-1, 7 Criteria of structures/equipment of structures/equipment of structures/equipment structures see grid HSA 3-1 Scoping survey S-2	÷			2-5; 5-2
compared to MARSSIM App. F of structures/equipment 4-24 to 26 reference coordinate system see grid Superfund App. F regulations & requirements App. C HSA 3-1 DOD C-15 to 20 replicate 4-35, 37 DOE C-4 to 12 sample 7-3 EPA C-1 to 4 measurement 6-3 NRC C-12 to 15 residual resurrent 6-6, 7-3; States C-20, 21 representativeness 2-11, 24; 4-34; relative shift (Δ/σ) 5-26 to 35, 40, 7-27 to 12, 13 relative shift (Δ/σ) 5-26 to 35, 40, 7-27 to 12, 13 relative shift (Δ/σ) 5-26 to 35, 40, 7-27 to 12, 13 relative shift (Δ/σ) 5-26 to 35, 40, 7-27 to 12, 13 relative shift (Δ/σ) 5-26 to 35, 40, 7-27 to 12, 13 relative shift (Δ/σ) 5-26, 5-32 reproducibility 4-27; 6-61 relative shift (Δ/σ) 5-29, 5-33; residual radioactivity 2-3, 26; 3-24; atlemate surve shift (Δ/σ) 5-28, 33 land areas	KCK			
Superfund App. F HSA 3-1	compared to MARSSIM		of structures/equipment	
Pregulations & requirements App. C Scoping survey 5-2				App. F
Second	•	ZIII	_	
DOD C-1 to 20 DOE C-4 to 12 EPA C-1 to 4 NRC C-12 to 15 States C-20, 21 relative shift (Δ/σ) 5-26 to 35, 40, 42; 8-12 to 15, 19; D-17, 20 calculate 5-26, 5-32 example 5-29, 5-33; A-11, 19 DQO process 2-9, 10, 31 number of data points 5-28, 33 number of data points 5-28, 33 P _r 5-27 Sign p 5-32 N/2 (WRS test) 5-30 N/2 (WRS test) 5-30 P _r 5-28 Sign p 5-32 release criterion 1-1, 2, 5; 2-2 alternate null hypothesis 2-39 compliance 2-25 DCGLs 4-3 final status survey 1-11, 2, 5; 2-2 alternate null hypothesis 2-9, 26 statistical tests 2-25 DCGLs 4-3 final status survey lanning 5-1 rem (radiation equivalent man) see conversion table remedial action support survey figure 2-20 first control of the total remains ample as sample 7-3 sample 7-3 measurement 6-3 repricate sample 7-3 measurement 6-6-67-3; n-12, 13 4-12, 4-27; 6-61 residual radioactivity 2-3, 26, 3-24; 4-17, 24 analytical procedures 7-17 to 23 residual radioactivity 2-3, 26, 5-10 feed analytical procedures 7-17 to 23 repricate sample 7-3 measurement 6-6-6, 7-3; n-12, 13 repricate sample 6-6, 7-3; n-12, 13 reproducibility 2-3, 26, 5-10 n-12, 1, 24 analytical procedures 7-17 to 23 resid		ota Ann C	scoping survey	5-2
DOE C-4 to 12 EPA C-1 to 4 NRC C-12 to 15 States C-20, 21 relative shift (Δ/σ) 5-26 to 35, 40,	2	* *	replicate	4-35, 37
FPA C-1 to 4 measurement FPA NRC C-12 to 15 measurement FPA NRC C-12 to 15 measurement FPA NRC C-20, 21 measurement FPA States C-20, 21 measurement FPA C-3 to 25 C-3 to			_	
NRC C-12 to 15 States C-20, 21 relative shift (Δ/σ) 5-26 to 35, 40,			_	
States C-20, 21 representativeness 2-11, 24; 4-34; 6-6; 7-3; 6-6; 7-3; 8-6 relative shift (Δ/σ) 5-26 to 35, 40, 42; 8-12 to 15, 19; D-17, 20 reproducibility 4-27; 6-61 calculate example 5-26, 5-32 residual radioactivity 2-3, 26; 3-24; 4-1, 24 example 5-29, 5-33; 4-1, 19 analytical procedures characterization surveys 7-17 to 23 DQO process 2-9, 10, 31 publication surveys land areas 5-11 publication surveys number of data points 5-28, 33 publication surveys land areas 5-11 publication surveys Ngign p 5-27 publication surveys land areas 5-10 publication surveys N (Sign test) 5-34 publication surveys land areas 5-40, 50, 51 publication surveys N/2 (WRS test) 5-30 publication surveys remedial action design 5-18 publication surveys Sign p 5-32 publication surveys restricted use 1-1; 5-7 release criterion 1-1, 2, 5; 2-2 publication surveys see unrestricted release 8-12 to 16 release criterion 1-1, 2, 5; 2-2 publication surveys see test statistic salternate null hypothesis 2-9, 26				
relative shift (Δ/σ) 5-26 to 35, 40, 42; 8-12 to 15, 19; D-17, 20 6-6; 7-3; N-12, 13 calculate 5-26, 5-32 reproducibility 4-27; 6-61 example 5-29, 5-33; A-11, 19 analytical procedures characterization surveys 7-17 to 23 DQO process 2-9, 10, 31 characterization surveys 7-17 to 23 number of data points 5-28, 33 land areas 5-11 P _r 5-27 structures 5-10 Sign p 5-32 final status survey tables land areas 5-40, 50, 51 N (Sign test) 5-34 structures 5-44, 48 to 50 N/2 (WRS test) 5-30 remedial action design 5-18 P _r 5-28 see surface contamination 5-18 P _r 5-28 see unrestricted use 1-1; 5-7 release criterion 1-1, 2, 5; 2-2 restricted use 1-1; 5-7 see compliance 2-25 see unrestricted release DCGLs 4-3 structures 5-45, 49; 8-2 Statistical tests <td< th=""><th></th><th></th><th>representativeness</th><th>2-11 24: 4-34:</th></td<>			representativeness	2-11 24: 4-34:
A2; 8-12 to 15,			representativeness	
19, D-17, 20 reproducibility 4-27; 6-61	relative shift (Δ/σ)			
calculate 5-26, 5-32 residual radioactivity 2-3, 26; 3-24; 4-1, 24 example 5-29, 5-33; A-11, 19 analytical procedures 7-17 to 23 DQO process 2-9, 10, 31 characterization surveys number of data points 5-28, 33 land areas 5-11 Pr 5-27 structures 5-10 Sign p 5-32 final status survey tables land areas 5-40, 50, 51 N (Sign test) 5-34 structures 5-40, 50, 51 N/2 (WRS test) 5-30 remedial action design 5-18 Pr 5-28 see surface contamination 5-18 Sign p 5-32 restricted use 1-1; 5-7 release criterion 1-1, 2, 5; 2-2 see unrestricted release alternate null hypothesis 2-39 robust 2-35, 37; 8-6 compliance 2-25 s 5-45, 49; 8-2 DCGLs 4-3 S+ 8-12 to 16 final status survey 2-24 see test statistic survey planning<			raproducibility	
A-11, 19				
A-11, 19 analytical procedures 7-17 to 23			residual radioactivity	
DQO process number of data points 2-9, 10, 31 process characterization surveys land areas 5-11 structures 5-11 structures 5-10 structures 5-40, 50, 51 structures 5-40, 50, 51 structures 5-44, 48 to 50 structures 5-18 structures 5-18 structures 5-44, 48 to 50 structures 5-18 structures 5-18 structures structures 5-18 structures structures 5-18 structures 5-18 structures 5-18 structures structures 5-45, 49, 8-2 structures 5-45, 49; 8-2 struc	example	, , , , , , , , , , , , , , , , , , ,	1.2.1	
Number of data points 5-28, 33 land areas 5-11	D00			7-17 to 23
Pr 5-27 structures 5-10 Sign p 5-32 final status survey tables land areas 5-40, 50, 51 N (Sign test) 5-34 structures 5-44, 48 to 50 N/2 (WRS test) 5-30 remedial action design 5-18 Pr 5-28 see surface contamination 5-18 Sign p 5-32 restricted use 1-1; 5-7 release criterion 1-1, 2, 5; 2-2 restricted use 1-1; 5-7 alternate null hypothesis 2-39 robust 2-35, 37; 8-6 compliance 2-25 see unrestricted release p DCGLs 4-3 S+ 8-12 to 16 statistical tests 2-9, 26 see test statistic sample(s) 2-4 statistical tests 2-25 sample(s) 2-4 survey planning 5-1 alternate survey design 2-33 rem (radiation equivalent man) background 4-13 blanks 7-5 Chain of Custody 7-23 to 25 checklis			•	5 11
Sign p 5-32 final status survey land areas 5-40, 50, 51 N (Sign test) 5-34 structures 5-44, 48 to 50 N/2 (WRS test) 5-30 remedial action design 5-18 P _t 5-28 see surface contamination Sign p 5-32 restricted use 1-1; 5-7 release criterion 1-1, 2, 5; 2-2 see unrestricted release alternate null hypothesis 2-39 robust 2-35, 37; 8-6 compliance 2-25 s 5-45, 49; 8-2 DCGLs 4-3 S+				
Land areas S-40, 50, 51 N (Sign test) S-34 structures S-44, 48 to 50 N/2 (WRS test) S-30 remedial action design S-18 P _r				5-10
N (Sign test) 5-34 structures 5-44, 48 to 50 N/2 (WRS test) 5-30 remedial action design P _r 5-28 see surface contamination Sign p 5-32 restricted use 1-1; 5-7 release criterion 1-1, 2, 5; 2-2 see unrestricted release alternate null hypothesis 2-39 robust 2-35, 37; 8-6 compliance 2-25 s 5-45, 49; 8-2 DCGLs 4-3 S+		3-32	•	5 40 50 51
N2 (WRS test) 5-30 remedial action design S-18		5 24		
Pr 5-28				
Sign p 5-32 restricted use 1-1; 5-7 release criterion 1-1, 2, 5; 2-2 see unrestricted release alternate null hypothesis 2-39 robust 2-35, 37; 8-6 compliance 2-25 s 5-45, 49; 8-2 DCGLs 4-3 S+ 8-12 to 16 final status survey 2-24 see test statistic null hypothesis 2-9, 26 sample(s) 2-4 statistical tests 2-25 sample(s) 2-4 survey planning 5-1 alternate survey design 2-33 rem (radiation equivalent man) background 4-13 blanks 7-5 Chain of Custody 7-23 to 25 characterization 2-15, 23; 5-18 to land 5-11 checklist 5-20 confirmation/verification 2-25 figure 2-20 confirmation/verification 2-25 remedial actions 2-16 confirmation/verification 2-25				5-10
release criterion 1-1, 2, 5; 2-2 see unrestricted release alternate null hypothesis 2-39 robust 2-35, 37; 8-6 compliance 2-25 s 5-45, 49; 8-2 DCGLs 4-3 S+ 8-12 to 16 final status survey 2-24 see test statistic see test statistic null hypothesis 2-9, 26 sample(s) 2-4 statistical tests 2-25 alternate survey design 2-33 background 4-13 blanks 7-5 Chain of Custody 7-23 to 25 characterization 1and 5-11 checklist 5-20 structures 5-10 confirmation/verification 2-25 table 2-20 criteria 4-19, 21			-	1 1.57
alternate null hypothesis 2-39 robust 2-35, 37; 8-6 compliance 2-25 s 5-45, 49; 8-2 DCGLs 4-3 S+ 8-12 to 16 final status survey 2-24 see test statistic null hypothesis 2-9, 26 see test statistic survey planning 5-1 see test statistic rem (radiation equivalent man) see conversion table 2-15, 23; 5-18 to checklist 5-20 confirmation/verification figure 2-20 criteria 4-19, 21 checklist 5-20 criteria 4-19, 21 checklist 5-20 criteria 4-19, 21 checklist 5-21 criteria 4-19, 21 checklist 5-20 criteria 4-19, 21 checklist 5-20 criteria 4-19, 21 checklist 5-20 criteria 4-19, 21 checklist 6-25 criteria 4-19, 21	<u> </u>			1-1; 5-7
Compliance 2-25 S 5-45, 49; 8-2 DCGLs 4-3 S+ 8-12 to 16 final status survey 2-24 see test statistic mull hypothesis 2-9, 26 statistical tests 2-25 survey planning 5-1 alternate survey design 2-33 rem (radiation equivalent man) background blanks 7-5 remedial action support survey 2-15, 23; 5-18 to 20; 6-12; 8-25 checklist 5-20 confirmation/verification 2-25 figure 2-20 criteria 4-19, 21 compliance 5-45, 49; 8-2 S+ 8-12 to 16 see test statistic sample(s) 2-4 see test statistic sample(s) 2-33 background 4-13 blanks 7-5 Chain of Custody 7-23 to 25 characterization land 5-11 structures 5-10 confirmation/verification 2-25 confirmation/verification 2-25 criteria 4-19, 21				2 27 27 2 5
DCGLs 4-3 final status survey 2-24 null hypothesis 2-9, 26 statistical tests 2-25 survey planning 5-1 rem (radiation equivalent man) see conversion table remedial action support survey 2-15, 23; 5-18 to 20; 6-12; 8-25 figure 2-20 checklist final status survey 2-24 see test statistic sample(s) alternate survey design background blanks 7-5 Chain of Custody characterization land 5-11 structures confirmation/verification criteria 4-19, 21			robust	
final status survey null hypothesis 2-9, 26 statistical tests 2-25 survey planning 5-1 rem (radiation equivalent man) see conversion table remedial action support survey 2-15, 23; 5-18 to 20; 6-12; 8-25 checklist figure 2-20 to land 5-11 see test statistic sample(s) 2-4 alternate survey design background blanks 7-5 Chain of Custody characterization land 5-11 structures 5-10 confirmation/verification criteria 4-19, 21				5-45, 49; 8-2
null hypothesis 2-9, 26 statistical tests 2-25 survey planning 5-1 rem (radiation equivalent man) see conversion table remedial action support survey checklist 5-20 figure 2-20 sample(s) 2-4 alternate survey design 2-33 background 4-13 blanks 7-5 Chain of Custody 7-23 to 25 characterization land 5-11 structures 5-10 confirmation/verification 2-25 cnigure 4-19, 21			S+	8-12 to 16
statistical tests survey planning survey planning see conversion table remedial action support survey checklist figure 2-25 sample(s) 2-4 alternate survey design background blanks 7-5 Chain of Custody characterization land 5-11 structures confirmation/verification confirmation/verification criteria 2-25 checklist 5-20 confirmation/verification criteria 2-4 4-13 blanks 7-5 Chain of Custody characterization 2-23 confirmation/verification 2-25 confirmation/verification criteria 4-19, 21	-		see test statistic	
survey planning 5-1 alternate survey design background 4-13 rem (radiation equivalent man) see conversion table blanks 7-5 Chain of Custody 7-23 to 25 characterization 2-15, 23; 5-18 to land 5-11 20; 6-12; 8-25 structures 5-10 checklist 5-20 confirmation/verification 2-25 figure 2-20 criteria 4-19, 21		*	sample(s)	2-4
rem (radiation equivalent man) see conversion table remedial action support survey 2-15, 23; 5-18 to 20; 6-12; 8-25 checklist figure 2-20 confirmation/verification 2-15, 216 confirmation/verification 2-15, 23; 5-18 to 20; 6-12; 8-25 confirmation/verification 2-25 confirmation/verification 2-15, 23; 5-18 to 2-25 characterization 2-25 confirmation/verification 2-25 criteria 4-19, 21			= ` ` /	2-33
blanks 7-5 remedial action support survey 2-15, 23; 5-18 to 20; 6-12; 8-25 checklist 5-20 figure 2-20 toble 1		-		4-13
remedial action support survey Chain of Custody characterization 7-23 to 25 characterization 2-15, 23; 5-18 to 25; 5-18 to 20; 6-12; 8-25 land structures 5-11 characterization checklist 5-20 confirmation/verification figure 2-25 characterization 2-25 characterization checklist figure 2-20 confirmation/verification criteria 2-25 characterization	· •	man)	•	7-5
characterization 2-15, 23; 5-18 to 20; 6-12; 8-25 checklist figure 2-20 characterization land 5-11 structures 5-10 confirmation/verification 2-25 criteria 4-19, 21			Chain of Custody	7-23 to 25
20; 6-12; 8-25 structures 5-10 checklist 5-20 confirmation/verification 2-25 figure 2-20 criteria 4-19, 21	remedial action support s			
checklist 5-20 structures 3-10 figure 2-20 confirmation/verification 2-25 table 2-16				5-11
figure 2-20 criteria 4-19, 21	4445.4		structures	5-10
toble 2.16			confirmation/verification	2-25
table 2-16 DCGLs 4-4			criteria	4-19, 21
	table	∠-10	DCGLs	4-4

sample(s) (continued)		sigma (σ)	
documentation	5-52	see standard deviation	
final status survey	0 02	Sievert (Sv)	
locations	5-40 to 44	see conversion table	
number of data points	5-25 to 39		2 2 27 29 5 25
matrix spikes	7-4	Sign test	2-3, 27, 28; 5-25;
packing/transport	7-25 to 28	1	8-11 to 16
preservation of	7-16, 17	applying test	8-12
QC	4-32 to 38	example(s)	8-12, 14
remedial action	5-19	hypothesis	8-11 5-21 to 25
sampling	2-4	number of data points	5-31 to 35
scoping	5-2, 3	example	5-33, 35 I-25, 26
soil	7-11 to 14	power Sign p	5-32
surrogate	4-4		
water & sediments	5-12, 13	site(s)	Chap. 1
Sampling and Analysis Pla	n 2-6; 9-3	clearing for access	4-24
scanning	2-4; 4-17	decommissioning	4-1
alpha	6-14	definition	2-3
alpha scanning sensitivity	0-14	historical assessment	Chap. 3
equations - derivations	App. J	identification	2-16; 3-4
beta	6-15	investigation process	2-14
demonstrating compliance	2-31	site preparation	4-22
detectors	6-15 to 18, 20 to	site reconnaissance	3-9
detectors	22, 57; App. H	identify contamination	3-13
elevated activity	2-29	site model	3-22
gamma	6-14	smear (swipe)	
MDCs	6-37 to 49	see removable activity	
pattern (example)	A-6	soil	3-13 to 15
sensitivity	6-37 to 49	analysis	7-17 to 23
survey techniques	4-17; 6-13 to 15	background	4-13
scanning surveys		sampling	7-11 to 14
scoping	5-3, 6	surveys	5-33, 9 to 11, 19,
characterization			33, 47, 50, 51
land areas	5-11	survey coverage	2-32; 5-47
structures	5-10	source term	4-21
remedial action	5-19	split	
final status		regulatory verification	2-25
Class 1 areas	2-32; 5-46	sample	4-35; 7-3, 14
Class 2 areas	2-32; 5-47	standard deviation	2-9, 31; 4-16;
Class 3 areas	2-33; 5-48		5-26, 29, 31, 32,
scoping survey	2-15, 22; 5-1 to 6		45, 49; 8-2, 10,
area classification	4-11		12 to 15, 19, 23;
checklist	5-5, 6		A-11, 19; N-17
figure	2-19	standard operating proce	
HSA & planning	3-1, 2	- serious proce	6-3, 51;
table	2-16		7-9, 19, 25
sealed source			· · · · · · · · · · · · · · · · · · ·
final status survey example	App. B		
	. =		

statistical tests	2-25; 4-11; 5-25;	survey	
	Chap. 8; App. I	approach	Chap. 1
alternate methods	2-34 to 38	DCGLs	4-3
documenting	8-25, 26	decommissioning criteria	4-1
interpreting results	8-21 to 25	DQOs	2-9 to 11
selecting a test	8-6, 7; E-4	field measurements	Chap. 6
summary (table)	8-9	instruments/technique	4-16; App. H
verify assumptions	8-7, 8; E-4	overview	Chap. 2
stem & leaf display	8-5, 7; I-17, 18	planning	2-8 to 11;
structures	3-20	CARR	Chap. 5
access	4-25	QAPP	2-6
HSA site plots	3-8	sampling/preparation	Chap. 7, App. M
measurements	4-20	simplified procedure	App. B
reference coordinate system	4-27 to 31	site investigation process	2-14
surface activity	5-10	statistical tests	2-25; Chap. 8;
surveys	5-7 to 10, 46, 47		App. I
survey coverage	5-47	survey considerations	Chap. 4
survey example	App. A	using MARSSIM see characterization	1-6; Roadmap 5-7 to 16
survey unit	2-4; 4-14, 15		5-20 to 53
WRS test (example)		see final status see HSA	5-20 to 55 Chapter 3
Class 1	8-21, App. A	see risa see remedial action	5-17 to 19
Class 2	8-19	see scoping	5-17 to 6
Student's t test	2-35, 37	see Scoping see Data Life Cycle	3-1 10 0
subsurface soil (sample)	1-9; 4-24	see survey unit	
characterization survey	5-9, 5, 11	survey checklist	
HSA	3-11, 13, 14	characterization	5-16, 17
sampling	7-16; App. M	final status	5-53 to 55
surface contamination	1-3, 4	remedial action	5-20
detectors		scoping	5-5, 6
alpha	6-20	statistical tests	8-27
beta	6-21	survey plan	1-5; 2-6; 5-54;
gamma	6-22	First Paris	7-8, 18
direct measurements	6-10 to 13	alternate designs	2-33 to 40
identification	3-12	design	Chap. 4; Chap. 5
in situ spectrometry	6-11, 12	DQOs	2-9; 3-3
land areas	4-24	optimizing survey	2-30
scanning	6-13 to 15	survey unit	2-4; 4-14; 7-5;
soil	3-14	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	9-6, 8; N-16
structures	4-23; 5-10	area	4-15
surface activity DCGLs	4-4	characterization	5-9 to 5-11
surrogates/DCGLs	4-4	characterize/DQOs	2-9
surface soil	1-3, 1-4; 3-13	classification	2-28; 4-11, 12
background	4-13	classify/flowchart	2-17
sampling	7-9, 12 to 14, 16,	elevated activity	2-27
,	17, 21; App. M	HSA	3-1, 2, 4
surrogate measurements	4-4 to 7; 5-12;	identifying	4-14
	6-14; 9-7	investigation level	5-44 to 46
		statistics & final status survey	
		uniform contamination	2-28

surveyor(s)	4-22, 31; 6-24,	uncertainty (continued)	
	37, 38, 40 to 48	confidence intervals	6-53 to 55
selecting	6-8, 9	decision making	2-7
systematic uncertainty	6-50 to 52	DCGL	2-33
systematic grid	2-31, 32; 5-46;	estimating	2-11
•	6-7, 12; 8-19, 22	measurement	6-49 to 55
test statistic	8-12, 13, 15;	MDC	4-17
	D-16 to 19	propagation	6-52, 53
example (S+)	8-12 to 16	QC	4-32 to 38
example (W_r, W_s)	8-18	reporting	2-14
see critical level		statistical counting	6-52 6-50 to 52
total effective dose equival	lent (TEDE)	systematic/random	
1	2-2	unity rule (mixture rule)	2-27; 4-8; 5-38;
triangular sampling grid	5-35, 36,	adjusting DCCI a	8-21, 23
41-41-8 41-41-1	42 to 44; 8-4, 13,	adjusting DCGLs	4-8 to 4-10
	16, 19	unrestricted release	3-22
see systematic grid	-, -	validation	2-8, 11; 7-9; 9-2,
two-sample test	2-28; 5-25 to 31;		5, 7, 8; App. N
F =	D-10	verification	2-15, 25; 5-21;
alternate methods	2-37, 38		6-32; 7-9; 8-8;
nonparametric test	4-9 to 11		9-2, 4 to 7
see Wilcoxon Ranked Sign te	est	$\mathbf{W_r}$	8-18
Type I decision error	5-25 to 35; 6-33,	see test statistic	
	34; 8-8, 10, 13 to	\mathbf{W}_{s}	8-18
	15, 18, 19, 21;	see test statistic	
	9-8, 9; D-14 to	Wilcoxon Rank Sum (WR	S) test
	17, 21, 26, 28		2-28; 5-25 to 31;
DQOs	2-9, 10, 31		8-17 to 21
examples	8-10; A-7, 11,	adjusted data	8-20
	18; B-2	example	8-19, 21;
Type II decision error	5-25 to 35; 6-33,		A-10, 11, 18, 19
	34; 8-8, 10, 12 to	applying the test	8-18
	15, 19; 9-8, 9;	Class 1 example	8-21
	D-14 to 18, 20,	Class 2 example	8-19
	21, 26, 28	power	I-27 to 29
DQOs	2-9, 10, 31	spreadsheet formulas	I-30
examples	8-10; A-7, 11;	see two-sample test	
	B-2	working level	6-56
uncertainty	1-2; 2-25; 5-11,		
	14, 26, 29, 33,		
	35, 45, 46;		
	6-49 to 55; 7-3,		
	4, 8, 21; 8-17, 18;		
	9-7, 9		